REMARKS/ARGUMENTS

The Examiner is thanked for the Office Action mailed May 16, 2008. The status of the application is as follows:

- Claims 1-20 are pending, and claims 6 and 17-19 have been amended;

- The specification is objected to because of informalities;

- Claims 6-11 and 14-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Katsevich ("Analysis of an exact inversion algorithm for spiral Cone-Beam CT", 7 August 2002, Phys. Med Biol, Volume 42, pages 2583-2597);

- Claim 6 is rejected under 35 U.S.C. 102(b) as being anticipated by Turbell et al. ("An improved PI-method for reconstruction for helical cone-beam projections", 24-30 October 1999, Nuclear Science Symposium, 1999, IEEE, pages 865-868);

- Claims 6-11 and 15-19 are rejected under 35 U.S.C. 102(e) as being anticipated by Katsevich (US 6,574,299);

- Claims 1, 3, 12-13 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Katsevich (2002);

- Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Katsevich (2002) in view of Turbell et al. ("Non-Redundant Data Capture and Efficient Reconstruction for Helical Cone-Beam CT", 1999, IEEE, pages 1424-1425);

- Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Katsevich (2002) in view of Hsieh (US 6,529,575);

- Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Katsevich (2002) in view of Hsieh;

- Claims 7-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Turbell et al. (p. 865) in view of Katsevich ('299); and

- Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Turbell et al. (p. 865) in view of Katsevich ('299) and in further view of Zeng et al. (US 5,559,335).

The objections and rejections are discussed below.

The Objection to the Specification

The specification is objected to for informalities. In particular, the Office notes that on page 10, line 27 "Fig. 6" is disclosed which should be "Fig. 8". The objection should be withdrawn as the specification has been amended by replacing "Fig. 6" with "Fig. 8".

The Rejection of Claims 6-11 and 14-19 under 35 U.S.C. 102(b)

Claims 6-11 and 14-19 stand rejected under 35 U.S.C. 102(b) as being anticipated by Katsevich (2002). This rejection should be withdrawn because Katsevich (2002) does not teach each and every element as set forth in the subject claims and, therefore, does not anticipate claims 6-11 and 14-19.

> A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir. 1987). MPEP §2131.

Independent **claim 6** has been amended and now further recites multiplying the measuring values by weighting factors dependent on the location of the measuring value on the detector. Katsevich (2002) does not teach or suggest these claim aspects. Instead, Katsevich (2002) teaches multiplying the measuring values by weighting factors dependent on the location of the object point to be reconstructed in the examination zone. Accordingly, this rejection should be withdrawn.

Claims 7-14 depend from claim 6 and are allowable at least by virtue of dependency on an allowable base claim.

Independent **claim 15** is directed towards a method that includes identifying a first voxel from a plurality of voxels within an examination zone to reconstruct. The Office asserts that Katsevich (2002) discloses the claimed aspects (Abstract; pages 2584-2586, Section 2. The main inversion formula; pages 2586-2587, Section 3. Two particular cases of the inversion formula, including Theorem 2, Equation 15 and Figure 2). However, the referenced sections of Katesevich (2002) are silent with respect to identifying a first voxel from a plurality of voxels within an examination zone to reconstruct. If the Office disagrees, applicant requests that the

Office cite to a particular page and line number where such a teaching can be found. Accordingly, this rejection should be withdrawn.

Claim 16 depends from claim 15 and is allowable at least by virtue of dependency on an allowable base claim.

Independent **claim 17** has been amended to include aspects directed toward multiplying the measuring values by weighting factors dependent on the location of the measuring value on the detector. As discussed *supra*, Katsevich (2002) teaches multiplying the measuring values by weighting factors dependent on the location of the object point to be reconstructed in the examination zone. Accordingly, this rejection should be withdrawn.

Claims 18-19 depend from claim 17, and are allowable at least by virtue of dependency on an allowable base claim.

The Rejection of Claim 6 under 35 U.S.C. 102(b)

Claim 6 stands rejected under 35 U.S.C. 102(b) as being anticipated by Turbell et al. (p. 865). **Claim 6** has been amended to include aspects absent in Turbell et al., rendering this rejection moot.

The Rejection of Claims 6-11 and 15-19 under 35 U.S.C. 102(e)

Claims 6-11 and 15-19 stand rejected under 35 U.S.C. 102(e) as being anticipated by Katsevich ('299). This rejection should be withdrawn because Katsevich ('299) does not teach each and every element as set forth in the subject claims and, therefore, does not anticipate claims 6-11 and 15-19.

Independent **claim 6** has been amended to include aspects directed toward multiplying the measuring values by weighting factors dependent on the location of the measuring value on the detector. Katsevich ('299) does not teach these claim aspects. Accordingly, this rejection should be withdrawn.

Claims 7-11 and 14 depend from claim 6 and are allowable at least by virtue of dependency on an allowable base claim.

Independent **claim 15** is directed towards a method that includes reconstructing the first voxel as function of the first set of corresponding projection angles indicative of angles at which

a radiation beam traverses the first voxel. The Office asserts that Katsevich ('299) discloses in Figure 2, steps 10, 51 (which is part of step 50) and 60 teaches the above-noted claim aspects. However, in step 10, projections are obtained from computer memory, in step 51, a reconstruction point x is fixed, and in step 60, the steps 10-50 are repeated for additional projections stored in the memory.

Step 50 includes steps 51-58. At step 51, a reconstruction point x is fixed. Step 52 determines whether the filtered data affects the image at x. If so, then the filtered data is used for image reconstruction at x. If not, then another point should be selected. In step 53, the projection x onto the detector plane and the unit vector, which points towards x is found. In step 54, lines from a family of lines and points on the lines that are close to the projection x are identified. In step 55, interpolation is used to estimate values from the results of the values obtained in step 54. In step 56, the contribution from the filtered data to the image being reconstructed at the point x is computed. In step 57, the contribution to the image being reconstructed at the point x is added according to a pre-selected scheme. In step 58, flow loops around step 51 and a next reconstruction point x is fixed.

From the above, it is readily apparent that the cited sections of Katsevich ('299) do not teach or suggest reconstructing the first voxel as function of the first set of corresponding projection angles indicative of angles at which a radiation beam traverses the first voxel as recited in claim 15. Accordingly, this rejection should be withdrawn.

Independent **claim 17** has been amended to include aspects directed to multiplying the measuring values by a weighting factor dependent on the location of the measuring value on the detector, and such limitations are absent in Katsevich ('299). Accordingly, this rejection should be withdrawn.

Claims 7-11, 16 and 18-19 depend directly or indirectly from independent claims 6, 15 and 17 are allowable to least by virtue of their dependencies.

The Rejection of Claims 1, 3, 12-13 and 20 under 35 U.S.C. 103(a)

Claims 1, 3, 12-13 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Katsevich (2002). This rejection should be withdrawn because Katsevich (2002) does not teach

or suggest all the limitations of the subject claims and, therefore, fails to establish a *prima facie* case of obviousness with respect to the subject claims.

> To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka,* 490 F.2d 981, (CCPA 1974). MPEP §2143.03.

Independent **claims 1 and 3** are directed to a computed tomography method. The method includes, *inter alia*, multiplying the integrated partial derivative of the measuring values by a first weighting factor which corresponds to the cosine of the cone angle of the ray associated with the measuring values and, by a second weighting factor which corresponds to the reciprocal value of the cosine of the fan angle of the beam associated with the measuring values. Katsevich (2002) does not teach or suggest these claim aspects.

The Office concedes that Katsevich (2002) fails to teach these claim aspects. In an attempt to make up for this conceded deficiency, the Office asserts that Katsevich (2002) in Section 3 discloses a vector form of the inversion formula following a change in variables and concludes it would have been obvious to one of ordinary skill in the art to modify the method of Katsevich (2002) to include the scalar form of the inversion formula since the two forms are art recognized equivalents and the selection of any two of these known forms would have been within the level of ordinary skill in the art.

However, the subject claims require a first weighting factor that corresponds to the cosine of the cone angle of the ray and a second weighting factor that corresponds to the reciprocal value of the cosine of the fan angle of the beam, and the comments by the Office reiterated in the preceding paragraph fail to show that Katsevich (2002) teaches or suggests the subject claim aspects. If the Office disagrees, applicants request the Office to explain how the above comments teach these claim aspect. Since Katsevich (2002) does not teach or suggest all claim aspects, and Katsevich (2002) does not make obvious the subject claim, and this rejection should be withdrawn.

Claim 12 depends from independent claim 6 and requires, *inter alia*, claim aspects similar to the aspects recited in claims 1 and 3. As such, the above discussion with respect to claims 1 and 3 applies *mutatis mutandis* to claim 12, and this rejection should be withdrawn.

Claim 13 depends from claim 6 and requires, *inter alia*, includes reconstructing the measuring values as a function of the following:

$$-\frac{1}{2\pi^2}\int_0^\pi d\varphi \frac{\cos\lambda}{R\cos\varepsilon}p(y(s(\varphi)),\Phi(s(\varphi),x)),$$

wherein, $p(y(s(\varphi)),\Phi(s(\varphi),x))$ denotes a weighted integration of a partial derivative of the

measuring values, $\dfrac{\cos\lambda}{R\cos\varepsilon}$ denotes a weighting factor, $\displaystyle\int_0^\pi d\varphi$ denotes an integration over the

projection angles φ, λ denotes a cone angle of the radiation, ε denotes a fan angle of the radiation, R denotes a radius of a helical trajectory, x denotes a location in the examination zone, $s(\varphi)$ denotes a parameter that is a function of φ, $y(s)$ denotes a function that indicates a radiation source position along the helical trajectory and is dependent upon a parameter s, and Φ denotes a unity factor which points from the radiation source position $y(s)$ in the direction of x.

The Office concedes that Katsevich (2002) fails to teach or suggest these claims aspects. In an attempt to make up for this conceded deficiency, the Office asserts that Katsevich (2002) discloses a vector form of the inversion formula following a change in variables and concludes it would have been obvious to one of ordinary skill in the art to modify the method of Katsevich (2002) to include the scalar form of the inversion formula since the two forms are art recognized equivalents and the selection of any two of these known forms would have been within the level of ordinary skill in the art. However, the foregoing does not teach or suggest the above-noted claim aspects. If the Office disagrees, applicants request the Office to explain how the foregoing teaches the claimed function. Accordingly, this rejection should be withdrawn.

Claim 20 depends from claim 1 and is allowable at least by virtue of dependency on an allowable base claim.

The Rejection of Claim 2 under 35 U.S.C. 103(a)

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Katsevich (2002) and further in view of Turbell et al. (p1424). **Claim 2** depends from claim 1 and is allowable at least by virtue of dependency upon an allowable base claim.

The Rejection of Claim 4 under 35 U.S.C. 103(a)

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Katsevich (2002) in view of Hsieh. This rejection should be withdrawn because the combination of Katsevich (2002) and Hsieh does not teach or suggest all the limitations of the subject claims and, therefore, fails to establish a *prima facie* case of obviousness with respect to the subject claims. Independent **claim 4** is directed to a computer tomograph. Claim 4 requires, *inter alia*, claim aspects similar to the aspects recited in claims 1 and 3. As such, the above discussion with respect to claims 1 and 3 applies *mutatis mutandis* to claim 4, and this rejection should be withdrawn.

The Rejection of Claim 5 under 35 U.S.C. 103(a)

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Katsevich (2002) in view of Hsieh. **Claim 5** depends from claim 1 and is allowable at least by virtue of dependency on an allowable base claim.

The Rejection of Claims 7-11 under 35 U.S.C. 103(a)

Claims 7-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Turbell et al. (p. 865) and further in view of Katsevich ('299). **Claims 7-11** depend from claim 6 and are allowable at least by virtue of dependency on an allowable base claim.

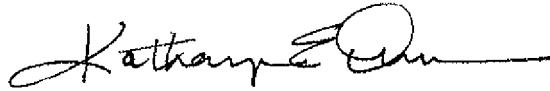### The Rejection of Claims 12 and 13 under 35 U.S.C. 103(a)

Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Turbell (p. 865) in view of Katsevich ('299) and further in view of Zeng et al. **Claims 12 and 13** depend from claim 6 and are allowable at least by virtue of dependency on an allowable base claim.

Conclusion

In view of the foregoing, it is submitted that the claims distinguish patentably and non-obviously over the prior art of record. An early indication of allowability is earnestly solicited.

Respectfully submitted,

Katharyn E. Owen Reg. No. 62,849
Anthony M. Del Zoppo, III Reg. No. 51,606
Driggs, Hogg, Daugherty & Del Zoppo Co., L.P.A.
38500 Chardon Road
Willoughby Hills, Ohio 44094
Phone: 1.440.391.5100
Fax: 1.440.391.5101

Direct all correspondence to:
Thomas M. Lundin, Reg. No. 48,979
Philips Intellectual Property & Standards
595 Miner Road
Cleveland, Ohio 44143
Phone: 1.440.483.4281
Fax: 1.440.483.2452